TRANSLATION NO. 2450

DATE: June, 1969

AD688754

DDC AVAILABILITY NOTICE

This document is subject to special export controls and each transmittal to foreign governments or foreign nationals may be made only with prior approval of Commanding Officer, Attn: AMXFD-BS, Fort Detrick, Frederick, Md. 21701

Distribution is unlimited.

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

15

On the problem of parasite fauna of the fishes of the lower Dnestr
(K voprosu of parazitofauno ryb nizov'ev reki Dnestra)

2450

by
M. P. Shumilo

Izv. Moldavsk. filiala Akad. Nauk SSSR, 1958 8 (53) 37-9

The study of fish parasites and of parasitic diseases associated with them is of particular importance for increasing fish productivity of rivers and reservoirs. The data about ichthyoparasites of the Dnestr aquatory, given by M.M.Kovalevskii[6], A.P.Markevich[10,11], O.Marku[12], R.Prondel[14] and I.Ciurea[17] are too fragmentary and do not give a complete picture of infestation of the fish population of the basin. The carrying out of systematic and planned studies of the fishes of the Dnestr basin became possible only after the Second World War. Planned study of fish parasites of the inland waters of the western provinces of the Ukr.S.S.R., including Dnestr, began in 1949 and was directed by V.A.Zakhvatkin[5]. Between 1948 and 1951 M.A.Palii[13] conducted an investigation of fish parasites in the fluvial ponds (Dnestr basin) in a number of provinces of Western Ukraine. Between 1949 and 1953 O.P.Kulakovskaya[7] studied the fish parasites of the upper Dnestr basin. This work was part of a complex parasitological study which is being carried out now by Ukrainian parasitologists under the direction of A.P.Markevich. Parasitological study of fishes of the Dnestr 'liman' is being conducted at present by A.S.Chernyshenko[15,16]. The parasite fauna of the fishes of the Dnestr on the territory of Mold.S.S.R. is being studied by N.M.Marita[8].

The present work is the result of ichthyoparasite studies conducted in the lower reaches of the river Dnestr during July-October and December 1951, and during May-September 1952.

The purpose of this work was 1) to study the intensity and extensiveness of infestation of fishes, 2) to establish the connection between parasite fauna and the character and special features of the river basin and also of the fishes themselves (their physiological state, age, stages of growth, nutrition, etc.), 3) to utilise the data on fish parasites for recommending appropriate anti-parasite measures

to be taken in the lower reaches of the Dnestr and 4) to augment available information on the fauna and zoogeography of fish parasites found in the waters of the Soviet Union.

Fish used for parasitological analysis was caught in the lower part of the Dnestr, between lake Beloye and the mouth of the river, and in 'plavni' situated between this sector of the river and the north-eastern bank of the Dnestr liman (village Mayaki, collective fish farm "Krasnyi Pridnestrovets"). Using the comprehensive method of parasitological studies[1] 437 individual fishes were examined, which belonged to 10 families and 32 species (see Table 1). Seven freshwater species of fish (Esox lucius, Scardinius erythrophthalmus, Tinca tinca, Carassius carassius, Cobitis taenia, Misgurnus fossilis, Perca fluviatilis) were taken from the catches caught in plavni. All other fish were from the river. Species examined were sub-divided into three biological groups: migratory, semi-migratory and freshwater fish. Data on infestation of fishes concern mainly individuals 1, 2, 3 and very rarely 4-5 years old. The absence of older fish corresponds fully to the character of fish population of the lower reaches of the Dnestr, which is distinguished by the predominance of young fish (F.S.Zambriborsch[4]).

(Table 1 to go here - see end of typescript, one page)

We shall limit ourselves to enumerating below the 111 species of discovered parasites, which are grouped into separate systematic groups; we shall also give brief information on the anatomy and biology of the organisms found, not previously available in the scientific literature.

I. SPOROZOA - 14 species - Myxidium lieberkühni Bütschli, 1882; Myxosoma dujardini Thélohan, 1892; M. branchialis (Markewitsch, 1932); Myxobolus bramae Rouas, 1906; M. carassii Klokačeva, 1914; M. ellipsoides Thélohan, 1892; M. mülleri Bütschli, 1882; M. musculi Keysselitz, 1908; M. oviformis Thélohan, 1892; M. parvicrus Wegener, 1909; Thelohanellus piriformis (Thélohan, 1892); Hennegwya psorospermica Thélohan, 1895; Glugea anomala (Moniez, 1887); Plistophora longifilis Schuberg, 1910.

For reasons over which we have no control, information about parasitic Protozoa concerns only Chidosporidia. The most widespread representative of this group was Myxobolus brama, whose cysts were found in 10 individuals of 7 species of fish. Detailed study of this parasite has shown that spore dimensions (10.5-14μ x 8-10.6μ), polar capsule dimensions (4-6.5μ x 2.3-2.45μ), the length of intercapsular process and the shape of spores vary greatly. The length of the filament reaches 50μ. However, after measuring the parasites it was established that all extreme deviations were connected by a series of graded transitions. Even within one cyst spherical and oval spores could be observed. These data once again confirm the opinion of V.A.Dolgiel[2] that Myxobolus balbiani Reuss, 1906 and Myxobolus sardinii Reuss, 1906 are not independent species but are representatives of one species, Myxobolus brama. It is interesting to note the variety of forms, dimensions and colours of the vegetative stage of Myxobolus carassii. Thus, in Rutilus frisii the white cysts of Sporozoa were situated along the gill fringe, acquiring the shape of a spindle and reaching 2.3 mm in length, the narrow part being 0.06 mm wide and the wide part - 0.3 mm. In Carassius carassius small spherical white cysts, 0.5-0.8 mm in diameter were found inside the lip. In the body cavity the cysts were yellowish coloured, egg shaped and had larger dimensions. The length of these cysts reached 1.5 mm, width - 1 mm. Myxobolus ellipsoides was found by us in three species of fish.

Table 2.

Dimensions of Spores and Polar Capsules in Myxobolus ellipsoides

No.	Parasite host	Organ infested	Length of spores (in μ)	Width of spores (in μ)	Length of polar capsules (in μ)
1	Aspius aspius	Cornea of the eye	14.5-15.9	7.9-10	5.3
2.	Tinca tinca	Gills	18.4-20.4	12.3	5.3
3	" "	Fins	14.2-16.7	12.4-12.7	4.5-5.3
4.	Misgurnus fossilis	Spleen	13.3-14.2	7.9-8.3	4.5

As can be seen from the above data, spores from the cysts found on the gills of Tinca tinca are larger than the dimensions of the parasite known before[9]. A similar phenomenon was observed also in relation to Thélohanellus piriformis. The following data had been given in the literature about the dimensions of this sporozoan. Length of spores 16-18μ, width 6-8μ, dimensions of polar capsules 5-7.5μ x 3.5μ. We found a somewhat larger parasite, i.e.: length of spores 18.4-19μ, width 7-8.8μ, length of polar capsules 7-8.2μ, width 3.2-4μ.

Deviations observed by us in the dimensions of Myxobolus ellipsoideus and Thelohanellus piriformis, found on the gills of Tinca tinca, are associated with special characteristics of the river basin and the host. Marked infestation of Neogobius fluviatilis by Microsporidia, in particular by Glugea anomala, should be specially noted. This parasite was found in 75% of Neogobius fluviatilis examined. The sporozoan was mainly located in the gut of the fish, covering its walls with a solid layer of cysts. The number of the latter was so great (more than 1000 per 1 cm^2) that not having enough room on one plane, they penetrated into the walls of the gut, causing their loosening. Compression of the gut and general wasting were observed in diseased Neogobius fluviatilis.

II. COELENTERATA - 1 species - Polypodium hydriforme Owsjannikow, 1871.

Polypodium hydriforme was found by us on 29/XI-1952 in 36 ova of one Acipenser stellatus. The latter weighed 5.5 kg. Information about the frequency of occurrence of this parasite is by no means extensive, since it concerns only one mature starred sturgeon. No doubt a check on a number of mature females belonging to the Acipenseridae and found in the lower reaches of the Dnestr would reveal a more frequent infestation with this polyp, particularly as the fishermen reported to us that this parasite was commonly found in the roe of the acipenserids.

III. TREMATODEA - 31 species - Bucephalus polymorphus Baer, 1827; Buc[illegible]clus markowitschi Kowal, 1949; Echinochasmus sp.; Anochallus danicus (Skrjabin et Lindtrop, 1919 Price, 1931; Allocreadium isoporum (Looss, 1894); A. transversale (Rudolphi, 1802); Coitocaecum skrjabini Iwanitsky, 1928; Asymphylodora tincae (Modeer, 1790); A. imitans (Nahling, 1898); A. markowitschi Kulakowskaja, 1947; A. demelli Markowsky, 1935;

Acanthocanicum Issaitschikov, 1923; Azygia lucii (O.F.Müller, 1776); Deropristis hians (Abildgaard in Rudolphi, 1819); Skrjabinopsolus acipenseris Ivanov, 1934; Paratormopsolus siluri (Dogiel et Lychowsky, 1939); Acanthocolpidae gen.sp.; Phyllodistomum elongatum Nybelin, 1926; Homalurus semendiculatus (Rudolphi, 1802), Looss, 1899; Lecithaster confusus Odhner, 1905; Diplostomulum spathaceum (Rudolphi, 1816); D. elevatum (Nordmann, 1832); D. huchesi Markewitsch, 1934; Neascus cuticola (Nordmann, 1832); N. musculicola (Waldenburg, 1850); N. brevicaudatus (Nordmann, 1832); Neodiplostomum (Scrimea) perlatum Ciurea, 1929; Tetracotyle variegata (Creplin, 1825); T. perca-fluviatilis Diesing, 1858; Apharyngostrigea cornu (Zeder, 1800) Ciurea, 1927; Aspidogaster limacoides Diesing, 1835.

Among digenetic trematodes pararite larvae were found most frequently. Thus, Diplostomulum spathaceum was found in 17 species of fish, Neascus cuticola in 16, Diplostomulum elevatum in 12. Coitocaecum skrjabini and Aspidogaster limacoides were the most common intestinal parasites, found in 7 species of fish. However, high intensity of infestation by digenetic trematodes was found in only 9 cases out of 253, where the number of parasites varied between 100 and 254. As regards Apharyngostrigea cornu, it should be noted, that although the extensivenoss of infestation with metacercariae of the trematode was insignificant, the intensity of infestation and the pathogenic effect on the host were considerable. In Scardinius erythrophthalmus this parasite caused castration of the ovary. Metacercariae of Neascus brevicaudatus, which often attack pike (80%), are of great practical importance. It has been established that of all the pike caught in 'plavni' and delivered to the distribution centre during the summer fishing season 5% were blind in one or both eyes due to infection with this parasite. Yet infrequently in such cases the contents of the eye run out and the lens fall out. Apophallus donicus, adult specimens of which parasitise domestic animals, is also of interest. The same applies to the larvae of Echinochasmus sp. Cobitis taenia was found for the first time to be the host of Diplostomulum huchesi. There is as yet no information in the literature about infest[illegible]n of Vimba and Serranus by metacercariae

of Neodiplostomum perlatum (I.Ciurea[17]).

Infestation of Silurus glanis by the trematode Paraterrorchelus siluri, which had not been reported before for the Black Sea region, should be mentioned. In the gut of Rutilus frisii six specimens of Acanthocolpidae gen. sp. were found, which is probably a new species. However, we cannot for the time being give it a specific name, since the parasite found in our material was represented by a small number of immature forms. Among digenetic trematodes found by us there were some which belonged to the parasite fauna of marine fish, i.e. Derogenetis bisepida, Skrjabinopsolus acipenseris, Hemiurus appendiculatus and Lecithaster confusus.

IV. MONOGENOIDEA - 26 species - Dactylogyrus clatus Linstow, 1878; D. anchoratus (Dujardin, 1845); D. chondrostomi Malewitzkaya, 1941; D. cornu Linstow, 1878; D. nybelini Markowitsch, 1933; D. crucifer Wagener, 1857; D. difformis Wagener, 1857; D. falcatus (Wedl, 1857); D. fraternus Wagener, 1909; D. intermedius Wagener, 1909; D. macracanthus Wagener, 1909; D. malleus Linstow, 1877; D. solidus Achmerow, 1946; D. sphyrna Linstow, 1878; D. tuba Linstow, 1878; D. vastator Nybolin, 1924; D. wageneri Kulwiec, 1927; D. wunderi Bychowsky, 1931; Nybolin, 1936; Ancyrocephalus paradoxus Creplin, 1839; A. cruciatus (Wedl, 1857); Ancylodiscoides siluri (Zandt, 1924); Tetrancistrus monenteron (Wagener, 1857) Diesing, 1858; Gyrodactylus medius Katharinor, 1893; Dipharhothrium armatum Leuckart, 1835; Diplozoon paradoxum Nordmann, 1832.

The parasite fauna of the fishes of the lower Dnestr ... characterised by a comparatively diverse composition of monogenetic trematodes. Infestation of Cyprinus carpio by Dactylogyrus solidus is of practical interest. On the gills of 43.7% of young (0+) Acipenser ruthenus between 1 and 11 specimens of Diplorhothrium armatum were found (where the trematodes were found ecchymoses were observed, and the gills of the diseased fish were covered with large quantities of mucus). The percentage of infestation by gill trematodes was worked out for 16 species of fish and this varied between 50-100. The intensity of infestation of fish by Dactylogyrus is sometimes as high as 100-200 specimens per individual. The only large Silurus glanis, weighing 15 kg,

had 545 specimens of Ancyrocephalidae silluri on its gills, which can be explained by the age of the host and the size of its gills. On Rutilus rutilus, Alburnus alburnus, Blicca bjoerkna, Abramis brama and Vimba vimba two species of Dactylogyrus were found, and on Carassius carassius - 4 (Dactylogyrus anchoratus, D. intermedius, D. vastator, D. wagneri).

V. CESTOIDEA - 16 species - Archillina foliacea (Rudolphi, 1819); Caryophyllaeus laticeps (Pallas, 1781); C. fimbriceps Annenkova, 1919; Caryophyllaeoides fennica (Schneider, 1902); Monobothrium wagneri Rybolin, 1922; Bothriocephalus dubius Saidat, 1937; Triaenophorus nodulosus (Pallas, 1781) Rudolphi, 1793; T. crassus Forel, 1880; Ligula intestinalis (Linne, 1758); Proteocephalus cornuus (Gmelin, 1770); P. rohlorum Dogiel et Bychowsky, 1939; P. osculatus (Goeze, 1782); P. percae (O.F.Müller, 1780); P. torulosus (Batsch, 1786); Cysticercus dilepidis Dogiel et Bychowsky, 1934; Pseudophyllidearum larva II Dogiel et Bychowsky, 1939.

Among tapeworms the family Proteocephalidae was represented in our material by 5 species. In extensiveness of infestation the first place belonged to the parasite Proteocephalus rohlorum (85%), found in Leuciscus fluviatilis, which was recorded for the first time in the Black Sea region by Dogiel V.A. and Bykhovskii B.E.(3). P. torulosus was found in 60% of all Perccus cultratus examined by us, and P. osculatus in 42.8% of Silurus glanis. The second place in extensiveness of infestation was taken by Caryophyllaeus laticeps, recorded in 62.7% of Abramis brama. It is characteristic that Cysticercus dilepidis, found in 16 Lucioperca fasciata only occurred in fish caught in summer (in 68.0%), while those examined in December were not infested with Cysticercus. Among rare and interesting findings Bothriocephalus dubius and Monobothrium wagneri should be noted. The latter had until now been reported only in the waters of Northern Italy. It is characteristic that Triaenophorus crassus was found in 25% of pike examined, and also in 33.3% of such a southern species as Silurus glanis. This fact confirms the view of fish parasitologists about the existence of a much wider area of distribution of this cestode, which used to be considered a northern species. Among cestodes included in the parasite fauna of marine fish Pseudophyllidearum larva II should be noted.

VI. NEMATODA - 7 species - Rhaphidascaris acus (Bloch, 1779); Contracaecum aduncum (Rudolphi, 1802); Goezia acanthoides (Goezo, 1782); Cyclozona acipenseralina Dogiel, 1932, Philonetra obturans Pronant; Eustrongylides excisus Jägerskiöld, 1909; Acanthocona sp. (Iwanow, 1933); Dogiel et Bychowsky, 1939.

Eustrongylides excisus, found in 11 species of fish, was the most widely distributed parasite. Pathogenic effect of this nematode is not in doubt. It is particularly marked in Lucioperca, where after penetrating into the muscles, the worm causes haemorrhage into the body cavity. Localised nematodes were observed in young fish. Thus, in one sturgeon, weighing 27 g, 16.5 cm long, two large larvae of E. excisus were found in the region of the tail. Capsules with parasites were located in the muscle immediately under the skin. The latter was torn in two places. Infestation with this larva was frequently observed in Silurus glanis (57%), Lucioperca lucioperca (38.6%) and Neogobius fluviatilis (35%). Acanthocona sp. was found in 7 species of fish. In one case about 300 larvae were found in Poloeus cultratus. For the first time pike was found to be the host of Goezia acanthoides. Two species of nematodes (Contracaecum aduncum and Cyclozona acipenseralina) belong to the parasite fauna of marine fish. Extensive infestation of Clupeonella delicatula (66.6%) with Contracaecum aduncum should be noted. This phenomenon can be explained by the location of this nematode, since its settling in the abdominal cavity (outer walls of the gut) protects the larvae from the harmful effect of fresh water. Intensive infestation of three Acipenser ruthenus by Cyclozona acipenseralina is probably connected with the penetration of an intermediate host of this worm from the 'liman' into the mouth of the river.

VII. ACANTHOCEPHALA - 2 species - Acanthocephalus lucii (Müller, 1767); Pomorhynchus laevis (Müller, 1787).

Acanthocephalus lucii was found in 6 species of fish. Intensive infestation was found in perch (86.4%), one of which had 49 worms. Pomorhynchus laevis was found in 5 species of fish. It must be noted that in Barbus barbus intensive infestation with this worm (55 and 72 specimens per individual fish) was observed. Most specimens of Echinorhi

hung from the wall of the gut into the body cavity; most frequently those were males. Larger sized females were located on the side of the lumen of the gut. P. laevis differed from A. lucii in that it was usually found on a small sector of the gut (in Barbus barbus), forming a kind of a living cork. This phenomenon could result in an ileus.

VIII. HIRUDINEA - 3 species - Piscicola geometra Linne, 1758; Cystobranchus fasciatus (Kellar, 1842); Hemiclepsis marginata O.F.Müller, 1774.

Of the leeches, Piscicola geometra was noted in 5 species of fish and Hemiclepsis marginata in 4. Usually 1-3 leeches parasitized each individual fish.

IX. MOLLUSCA - 1 species -(Unionidae sp.)

Extensive infestation of young Acipenser ruthenus (56.2%) and also of Alburnus alburnus (56.2%) and Gluecomella delicatula (53.3%) must be noted. Usually the number of larvae on the gills of each fish varied between 1 and 37. On the gills of one Macrobius fluviatilis 98 specimens of Uniodidae were found.

X. CRUSTACEA - 10 species - Ergasilus sieboldi Nordmann, 1832; E. briani Markewitsch, 1932; E. sp.; Caligus lacustris Steenstrup et Lutken, 1861; Dichelesthium oblongum (Abildgaard); Lernaeocera nulchella Nordmann, 1832; Lernaea cyprinacea Linné, 1758; Achtheres percarum Nordmann, 1832; Clavellina emarginata (Krøyer, 1837); Argulus foliaceus (Linne, 1758).

The group of parasitic Crustacea is represented in our work by a comparatively large number of species and has a mixed character. Side by side with typical freshwater forms, some representatives of parasite fauna of marine fishes were found (Dichelesthium oblongum and Clavellina emarginata). In the fishes which we examined Argulus foliaceus (in 5 species, Ergasilus sieboldi (in 4 species) and also copepod stages of Lernaea cyprinacea (in 7 species) were found most frequently. The greatest intensity of infestation was shown by Achtheres percarum, found in 72.2% of Lucioperca. In diseased fish ulceration of the gills was observed, and alternation of deep bleeding wounds with pale areas. Copepod stages of Lernaea cyprinacea were found in 38% of Cyprinus

carpio. Argulus foliaceus was found in 36.3% of Perca. In one case 51 specimens of Ergasilus sieboldi were found on the gills of Esox lucius, and infestation of Leuciscus fluviatilis with L. sp. reached the same intensity.

CONCLUSIONS

1. As a result of studies carried out, 111 species of fish parasites were discovered, and of these the groups of digenetic (31) and monogenetic (26) trematodes were the largest.

2. Parasites were found in 401 fishes, which represented 91.76% of the total number of fishes examined. Two hundred and fifty three fishes were infested with digenetic trematodes (57.91%), 217 - by monogenetic trematodes (49.65%), 100- by tape worms (22.88%), 88 - by round worms (20.14%), 73 - by Crustacea (16.7%), 61 - by Sporozoa (13.95%), 39 - by freshwater Naica (8.9%), 30 - by Acanthocephala (6.86%), 14 - by Hirudinea (3.2%) and 1 - by Coelenterata (0.23%).

3. The mixed character of fish population of the lower Dnestr determined the composition of the parasite fauna of the fishes examined. Thus, side by side with 102 freshwater species, which comprised 91.89%, 9 species (8.11%) were found which belonged to the parasite fauna of marine fishes.

4. On the basis of studies carried out the list of fish parasites found in the waters of Ukr.S.S.R. can be augmented by the following 12 species: Uvxobolus musculi, U. nermacnus, Acanthocolpidae gen. sp., Paratormopsolus silluri, Neodiplostomum nexlatum, Apharyngostrigea cornu, Diclybothrium armatum, Monobothrium wageneri, Bothriocelex dubius, Proteocephalus robiorum, Pseudophyllidearum larva II, Eustrongylidae gigantum.

5. The absence of specific parasites in Aspro zingel (L. sp.), which is endemic to the basin, was established.

6. The discovery of Echinochasmus sp. and Anonchotus fenicus (Skrjabin et Antipin, 1929) Price, 1931, whose adult forms parasitise the intestines of domestic animals (dog, cat, pig) and fowls, calls for an improvement in the sanitary supervision over fish products as a prophylactic measure.

7. When solving the problems of cultivation of Acipenseridae in the Dnestr basin it is essential to take into account Polypodium hydriforme Owsjannicow, 1871, found in the ova of Acipenser stellatus. In connection with frequent infestation of the young of Acipenser ruthenus (43.75%) by the gill trematode Dicelybothrium armatum Leuckart, 1835 the young fish of Acipenseridae should be passed through anti-parasite baths before putting them into breeding ponds.

8. In the lower reaches of the Dnestr frequent infestation of fishes (over 55%) by parasite larvae has been noted, and of these 10 species are known in their adult state as components of the parasite fauna of birds. Prophylactic measures aimed at breaking the life cycle of these parasites must therefore be taken (appropriate treatment of breeding and feeding ponds, and also of spawning ponds, the use of sludge tanks and systematic destruction and repulsion of piscivorous birds).

9. A characteristic feature of the fishes of the lower Dnestr is a comparatively slight infestation with endoparasites, which opens up the possibility of using fish from this basin largely for transferring to other rivers and reservoirs.

10. More than 20 species of parasites, known to be pathogenic agents of fish diseases, were found. However, it was only in relation to Glugea anomala (Moniez, 1887) that there was recorded in the basin an epizooty in Neoechinus fluviatilis. As regards other pathogenic forms, the intensity and extensiveness of infestation by them were insignificant. However, these fish parasites are a potential threat to the fish population, particularly in closed waters. The main percentage of these species was represented by a group of ectoparasites, in relation to which anti-parasitic measures have already been developed. Thus, if the sanitary-prophylactic measures are carried out in good time, using every method designed to eradicate diseases, one of the problems of improving fish productivity of the Dnestr basin should be solved.

- - - - - -

LITERATURE

Bykhovskaya-Pavlovskaya, I.A. "Parasitological study of fishes" (Parazitologicheskoe issledovanie ryb). M.-L. 1952.

Dogel', V.A. "Freshwater Myxosporidia of the U.S.S.R. Classification Tables of freshwater organisms of the U.S.S.R" No.IV, Lensnabtekhizdat, L., 1932 (Presnovodnye Myxosporidia SSSR, Opredeliteli organizmov presnykh vod SSSR, vyp.IV).

Dogel', V.A. and Bykhovskii, B.E. Parasites of fishes of the Caspian sea. Trudy po kompleks.izuch. Kasp.morya, VII, 1939.

Zambriborshch, F.S. "The state of stocks of the main commercial fishes in the Dnestr delta and the Dnestr 'liman' and the ways of maintaining them" (Sostoyanie zapasov osnovnykh promyslovykh ryb del'ty Dnestra i Dnestrovskogo limana i puti ikh vosproizvodstva). Sbornik rabot po Dnestrovskomu limanu i nizov'yam Dnestra, Odessa Gosuniversitet, Kiev, 2, 1953.

Zakhvatkin, V.O. and Kulakovskaya, O.P. "Parasites of fishes of the upper Dnestr" (Parasity ryb verkhiv'ya Dnistra) Naukovi zap.Lvivsk.naukovogo prirodoznavchogo muzeyu Akad.Nauk Ukr.S.S.R, 1951, I.

Kowalowski, M. Materialy do fauny helmintologicznej pasorzytniczej polskiej, 1-11, Sprawozdanie komisyi fizyograficznej, 1896, t.XXXI.

Kulakovskaya, O.P. Parasites of fishes of the upper Dnestr basin. Candidate thesis, L'vov, 1955.

Marits, N.M. Monogenetic trematodes of the fishes of Dobossarsk reservoir. Uch.zap.Tiraspolsk ped.in-ta, V, Kishinev, 1958.

Markevich, A.P. "Parasite fauna of freshwater fishes of the Ukr.S.S.R". (Parazitofauna presnovodnykh ryb Ukrainskoi SSR), Kiev, 1951.

Markevich, A.P. Zur Kenntnis der Myxosporidien von Süsswasserfischen der Ukraine. Zool.Anzeiger, 1932, Bd.99, H. 11/12.

Markevich, A.P. Neue Dactylogyrus - Art (Monogenea) aus der Ukraine. Zoolog.Anzeiger, Bd.103, H. 1/2, 18-20.

Marku, O. Die Schmarotzerkrebse der Fische in der Bucovina. Bull. Fac. Sc. de Cernăuti, 1935, IX, Fasc.1-2.

Palii, M.A. Parasite fauna of pond fishes in the western provinces of the Ukr.S.S.R. Candidate thesis, Odessa, ODU, 1952.

Prandol', A.R. Leeches of the Dnestr 'plavni'. Ezhegodnik Zoologicheskogo Muzeya (Yearbook of the Zoological Museum) Akad.Nauk S.S.S.R., 1923, XXIV.

Chernyshenko, A.S. On the problem of parasite fauna of endemic relict fishes. Zoologicheskii zhurnal, XXXV, 8.

Chernyshenko, A.S. Some data on the parasite fauna of the fishes of the Dnestr liman. In: Problemy parazitologii, Trudy II nauchnoi konferentsii parazitologov Ukr.S.S.R., Kiev

Ciurea, I. Sur une infestation parasitaire de la carpe causée par la metacercaire d'un trématode du genre Neodiplostomum railliet, Bull. de la section scientifique, XII-eme année, 1929, Bucarest, 1/2.

- - - - - - -

The Data of Ichthyoparasitological Studies — Table 1

№	Species of fish	Number of fish examined	Number of infested fish	Time of examination	Place where caught
1	Acipenser ruthenus L.	16	15	15/X—20/X 1951 ; 21/IX 1952	River
2	Ac. guldenstädti colchicus V. Marti	2	2	28/V 1952 ; 24/IX 1952	"
3	Ac. stellatus Pallas	4	4	20/IX—20/IX 1952	"
4	Ac. ruthenus X Ac. guldenstädti.	1	1	23/IX 1952	"
5	Caspialosa kessleri pontica (Eichwald).	4	4	11/VI 1952 ; 22/VI 1952	"
6	Clupeonella delicatula (Nordmann)	15	15	25/V 1952	"
7	Esox lucius L.	20	20	11/IX—14/IX 1951 ; 4/VII—22/VII 1952	Plavni
8	Rutilus rutilus (L.)	21	15	17/X—21/X 1951 ; 24/VII—15/IX 1952	River
9	R. frisii (Nordmann).	18	17	27/VII—25/IX 1952	"
10	Leuciscus leuciscus (L)	1	1	1/VIII 1952	"
11	L. cefalus (L.)	2	2	25/VII 1952 ; 31/VII 1952	"
12	Scardinius erythrophthalmus (L).	21	21	5/IX—8/IX 1951 ; 7/VI—30/VI 1952	Plavni
13	Aspius aspius (L).	21	21	11/VIII—17/VIII 1951 ; 25/VII—19/IX 1952	River
14	Tinca tinca (L).	20	15	5/IX—14/IX 1951 ; 14/IX—31/IX 1952	Plavni
15	Chondrostoma nasus (L).	2	2	11/VIII 1951 ; 14/VIII 1951	River
16	Barbus barbus (L).	3	3	27/VII—23/IX 1952	"
17	Alburnus alburnus (L).	16	16	23/V—26/V 1952	"
18	Blicca bjoerena (L).	21	20	22/X—24/X 1951 ; 21/VI—26/VI 1952	"
19	Abramis brama (L).	22	22	26/VII—31/VII 1951 ; 10/VI—23/VI 1952	"
20	Vimba vimba (L).	20	20	9/VIII—13/VIII 1951 ; 1/VIII—19/VIII 1952	"
21	Pelecus cultratus (L).	20	12	15/X—17/X 1951 16/IX 1952	"
22	Carassius carassius (L).	22	19	24/VII—5/IX 1951 ; 30/V—20/VI 1952	Plavni
23	Cyprinus carpio L.	21	13	1/VIII—13/VIII 1951 ; 24/VII—30/VII 1952	River
24	Cobitis taenia (L).	5	5	29/V 1952	Plavni
25	Misgurnus fossilis (L).	25	25	28/XII 1951 ; 7/VII - 26/VII 1952	"
26	Silurus glanis (L).	21	21	1/VIII—12/IX 1951 27/VII—21/IX 1952	River
27	Atherina mochon pontica Eichwald.	1	1	25/V 1952	"
28	Lepomis gibbosus (L).	1	1	27/VII 1952	"
29	Lucioperca lucioperca (L).	18	18	31/VII—9/VIII 1951 17/IX 1952	"
30	Perca fluviatilis L.	22	21	10/IX—13/IX 1951 ; 10/VI—30/VI 1952	Plavni
31	Aspro zingel (L).	11	9	3/VIII—18/VIII 1951 ; 31/VII—25/IX 1952	River
32	Neogobius fluviatilis (Pallas).	20	20	17/X—24/X 1951 ; 14/IX—21/IX 1952	"